Quickie S-11 Service Manual

SUNRISE MEDICAL
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Quickie S-11

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100740 Rev A

Quickie S-11 Troubleshooting Guide

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INTRODUCTION

Please read and follow instructions in this service manual before attempting to troubleshoot or repair this product for the first time.If there is anything in this Service Manual that is not clear, or if you require additional Technical assistance, contact Sunrise Medical at: (800) 333-4000 option 2, then option 1.

Safely troubleshooting and/or repair of this product depends on your diligence in following the instructions within this manual. Sunrise Medical is not responsible for injuries or damage resulting from a person's failure to exercise good judgement and/or common sense.

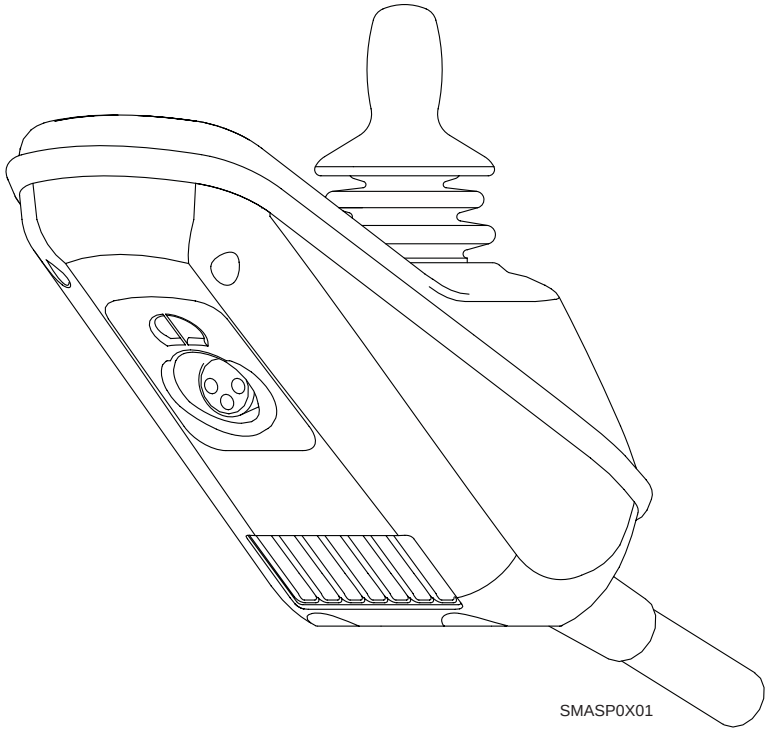
There are warning symbols used in this document to focus attention on any hazard that could effect the safety of the individual troubleshooting the chairs covered in this Service Manual.

This Service Manual has been compiled as a troubleshooting guide for the Quickie S-11. Photographs and content may differ from the actual products in some cases due to changes in specifications and other factors.

This Service Manual is intended for use by persons with a basic working knowledge and the skills required in servicing and maintaining Power Wheelchairs. Persons without a General Working knowledge and expertise in the servicing of this product should not carry out troubleshooting procedures. This can result in problems with future servicing, and/or damage to the unit.

Parts and configuration or specifications of Products included in this Service Manual are subject to change without prior notice.

VSI Controller

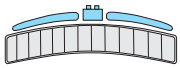


SMASP0X01

VSI Controller

SMASP0P01

VSI Controller Buttons



Battery Condition Meter- A series of ten LED's, which indicate charge level.

Speed/Profile indicator- A series of five LED's, whichdisplay speed and profile settings

On/Off Key- Press to power on or off the power chair or Controller.

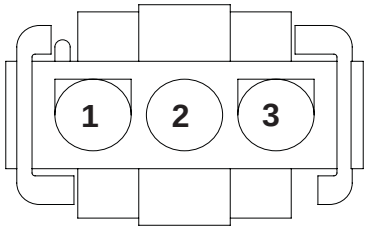
Horn Key- Activates a warning horn.

Speed/ Profile Decrease. Used to decrease the Speed/ Profile setting.

Speed/ Profile Increase. Used to Increase the Speed/ Profile setting.

CNTRLLR BTNS

Plugs/Connectors

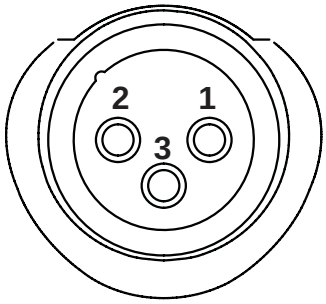


1 = 0 Vdc

2 = Inhibit 3

3 = 24 Vdc

3-pin connect
Outside View

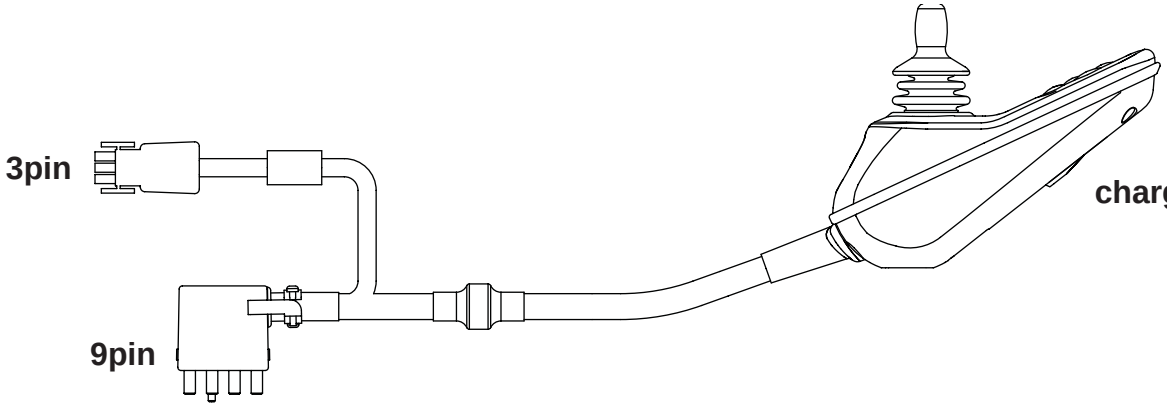


1 = 24 Vdc

2 = 0 Vdc

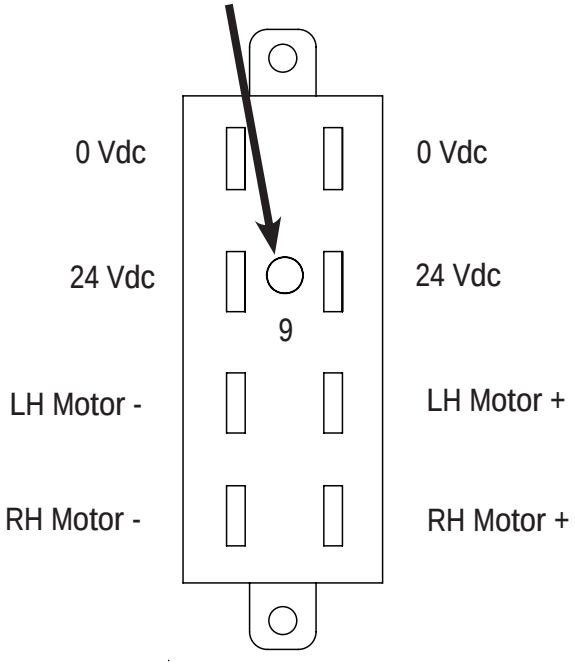
3 = Inhibit 1/ Programmer

Charger port
Outside View



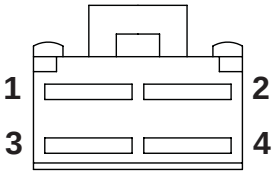
Controller and Harness

+24 Vdc Solenoid Brake Input



9-pin Connect Harness Socket Face

Motor Plug



4-pin connect

1 = Brake Solenoid

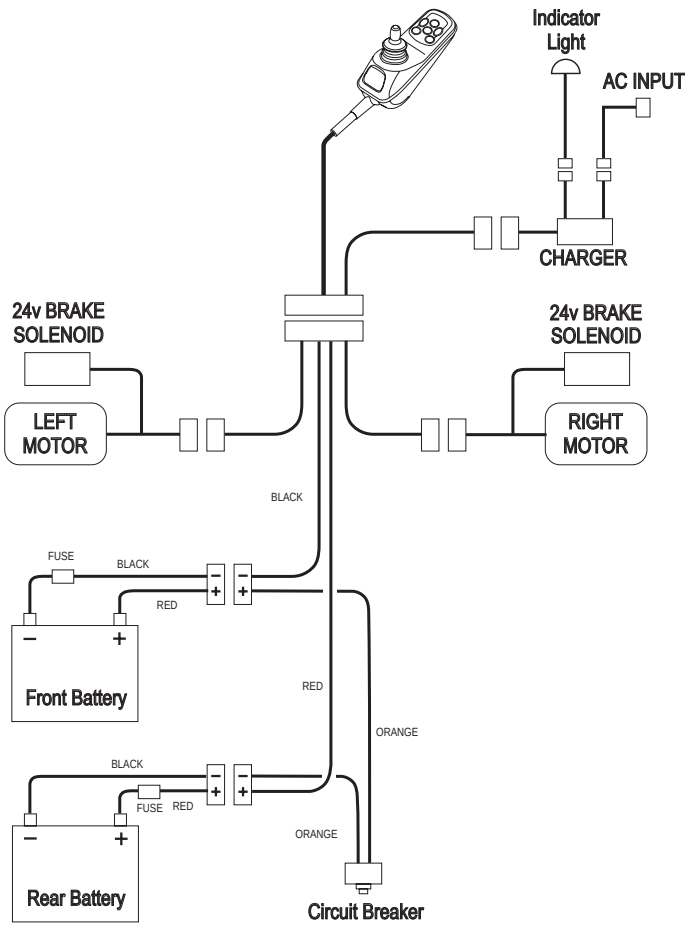
2 = Brake Solenoid

3 = Motor

4 = Motor

Main Wiring Diagram/Tool List

Wiring Diagram



WIRE_DGM1

Basic Tool List

For correct maintenence, adjustment, and for disassembly/reassembly of the power chair you will need the following tools:

1. 3mm Allen wrench
2. 4mm Allen wrench
3. 5mm Allen wrench
4. 6mm Allen wrench
5. 13mm Open-end wrench
6. 13mm Socket wrench
7. 17mm Deep Socket wrench
8. Phillips screwdriver #2
9. Flat blade screwdriver
10. Cutter for the zip-tie

Section 1

Troubleshooting: No Power

1.0 Circuit Breaker Reset

If On/off button is pressed and no light or bar is shown, check for tripped circuit breaker (see figure A1.0.1) and make sure all connections are clean and tight (including the batteries). If the problem persists, then perform the following diagnostics.

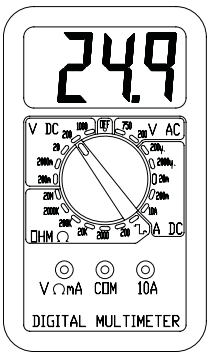
A1.0.1

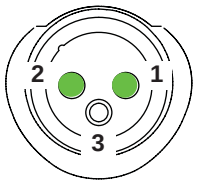
1.1 Test Joystick

Check that the voltage is going to the controller, set the meter to dc volts and take a voltage reading from pin 1 (using the red lead) and pin 2 (using the black lead) to the charger port of the VSI controller (see figure A1.1.1) If the voltage meter reads approximately 24 volts, replace the controller, if the meter reads less than 12 volts, proceed to the next step.

Note: Make sure the polarity is correct. If the reading is intermittent, there is a connection or Controller problem.If polarity is reversed proceed to step 1.6

A1.1.1





- *If the total Battery Voltage reads approx. 24 V, and the Polarity is correct, replace the controller.*

1.2 Battery Test

Check that the batteries are fully charged and in good condition. Remove the seat, and the battery cover, with controller connected and turned on, use the meter to check the voltage across the battery terminals (see figure A1.2.1). If the voltage meter reads between 12 -13.5 volts, then proceed to next step. If the voltage meter reads below 12volts,charge the batteries.

Note: To find a bad battery, use a battery load tester.

A1.2.1

- *If the voltage meter reads below 12 volts, charge the batteries.*

1.3 Re-Charging the Batteries

If the total Battery voltage is less than 18 Volts, charge each Battery separately with a 12 Volt Trickle Charger for a few hours. This should bring the voltage back up to the level that the On-Board Charger will activate.

1.4 Not Charging

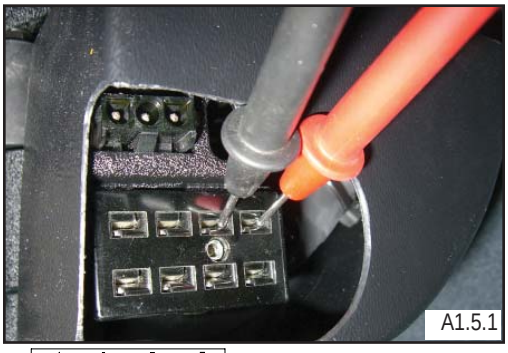
Check the charger indicator light in the front shroud. If it is not lighted, check the connection from the light to the charger. Check the Circuit Breaker Box and make sure it is not tripped. Make sure the 3 pin Charger plug is connected properly and is in good condition. Check all batteries and harness connections following steps 1.2 and 1.5 - 1.9 Check the connection from the A/C charging outlet to the charger. If none of these actions have corrected the problem, then replace the charger.

Note: On Board Charger Indicator Light shows Amber color when charging, and Green when fully charged.

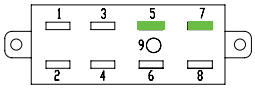
1.5 Battery Connection Check

Check that the female Beau plug on the chair has voltage. Set the meter to dc volts and measure pins 5 (using the red lead of the meter) and 7 (using the black lead of the meter) as shown in (figure A1.5.1).

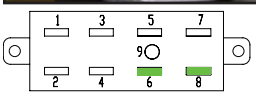
If the voltage meter reads full voltage, then measure pins 6 (using the red lead of the meter) and 8 (using the black lead of the meter) as shown in (figure A1.5.2). If both the measurements read full voltage, then replace the controller, or else proceed to the next step.



A1.5.1



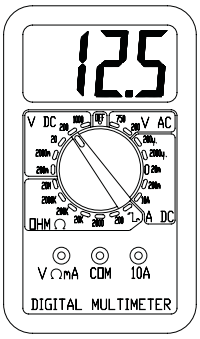
A1.5.2



- *If both of the measurements read full voltage, then replace the controller.*

1.6 Battery Wire Harness

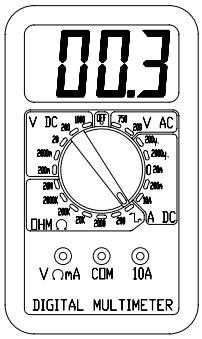
Check that the battery wire harness has the polarity correct. Set the meter to dc volts and measure the connector with the red lead on the red wire contact (top of the connector) and the black lead on the black wire contact (bottom of the connector) as shown in (figure A1.6.1). If both battery wire harnesses have full voltage and correct polarity, then proceed to step 1.8. If voltage is absent proceed to step 1.7. If polarity is reversed correct battery wiring.



- *If polarity is reversed correct battery wiring.*

1.7 Battery Fuse

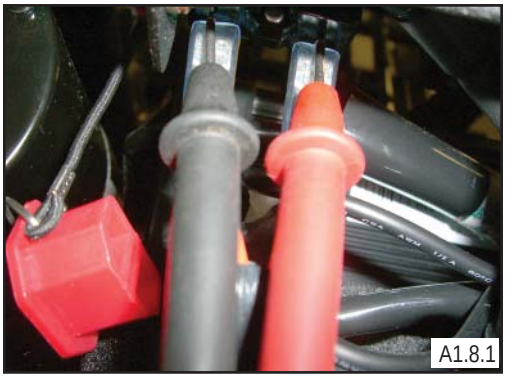
Check that the battery fuse is in good condition. With the batteries disconnected remove the fuse cap, inspect the fuse to see if the fuse is blown. To make sure the fuse is not blown, set the meter to ohms and measure the resistance across the fuse. see (figure A1.7.1). If the meter reads more than one ohm, change the fuse, or else proceed to the next step.

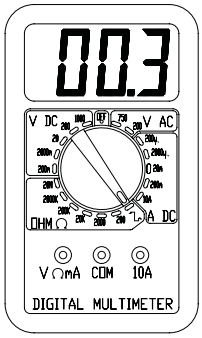


- *If the meter reads more than one ohm, change the Battery fuse.*

1.8 Circuit Breaker Test

To check the circuit breaker set the meter to ohms and measure the resistance across the circuit breaker as shown in (figure A1.8.1). If the meter reads more than 1 ohm, then change the circuit breaker, otherwise proceed to next step.





- *If the meter reads more than 1 ohm, then change the circuit breaker.*

1.9 Main Harness

If the above steps did not correct the problem, change the main harness.

- *If the previous steps did not correct the problem, change the main harness.*

Section 2

Understanding Controller Display

2.1 *The Maximum Speed Indicator Ripples*

The wheelchair is locked. To unlock the wheelchair, deflect the joystick forwards until the control system chirps. Then deflect the joystick in reverse until the control system chirps. Release the joystick, there will be a long beep. The wheelchair is now unlocked.

To lock the wheelchair, while the control system is switched on, depress and hold the on/off button. After 1 second, the control system will chirp. Now release the on/off button, deflect the joystick forwards until the control system chirps, and deflect the joystick in reverse until the control system chirps. Release the joystick, there will be a long beep. The wheelchair is now locked.

2.2 *The Maximum Speed Indicator Flashes*

This indicates that the chair is charging via on-board charger. The chair will be ready to drive as soon as the charger is unplugged.

2.3 *Battery Gauge is Steady*

This indicates that all is well.

2.4 *Battery Gauge Flashes Slowly*

The control system is functioning correctly, but you should charge the battery as soon as possible.

2.5 *Battery Gauge Steps Up.*

the wheelchair batteries are being charged with the offboard charger. You will not be able to drive the wheelchair until the charger is disconnected and you have reset the control system by switching off the power and then powering up again.

2.6 *Battery Gauge Blinks Once Every 2.5 Seconds*

The control system has "gone to sleep" because the wheelchair has not been driven for a period of time. The time period depends on the programming of the system. To re-start, reset the system by switching off the power and then powering up again.

2.7 *Battery Gauge Flashes Rapidly (even with the joystick released)*

The control system safety circuits have been activated and the control system hasbeen prevented from moving the wheelchair. This indicates a system trip, i.e. the VSI has detected a problem somewhere in the wheelchair's electrical system. Please refer to Section 3 (VSI Controller Diagnostics).

Section 3

Understanding VSI Controller Diagnostics Codes

3.1 One Bar - Low Battery Voltage

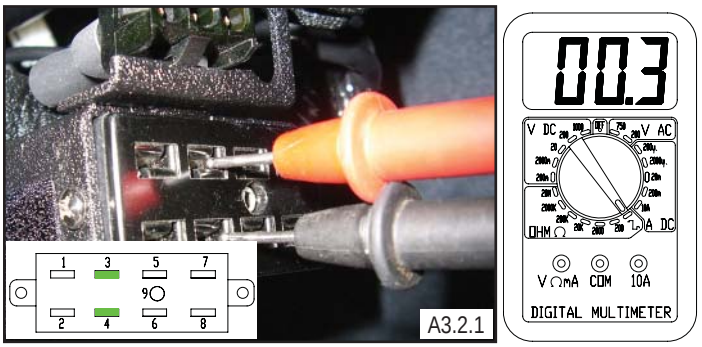
This code could indicate discharged batteries, failed batteries, or poor battery connections. Begin by recharging the batteries and then refer to Section 1 to check batteries and connections.

3.2 Two Bars - Left Motor Disconnected

The left hand motor has a bad connection. Check the connections to the left hand motor.

Test Left Motor Open

Check that the batteries are fully charged and in good condition; and check all cables and connections. Check the connections to the left motor, look for a loose or damaged connector. Remove the 9-pin Beau plug and check the resistance across pin 3 and pin 4 as shown in (figure A3.2.1). If the meter reads between 0 to 1.5 ohms, then replace the controller.



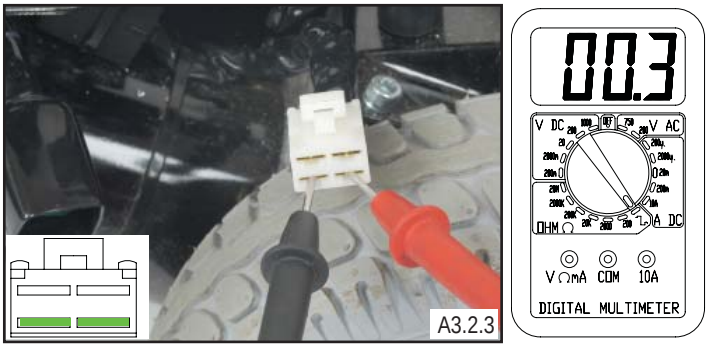
A3.2.1

- *If the meter reads between 0 to 1.5 ohms, then replace the controller.*

Otherwise, check both brushes on the left motor. (Refer to Section 4 Step 9 of this Service Manual for easiest access). Ensure that the brushes are not excessively worn, (replace as required). Top access for Motor brush shown in (figure A3.2.2)(requires shroud removal).

A3.2.2

Use the meter to check the resistance across the two bottom contacts (thicker wires) on the 4-pin motor connector as shown in (figure A3.2.3). If the meter reads between 0 to 1.5 ohms, then replace the main harness. If none of the above corrects the problem, replace the left motor.



A3.2.3

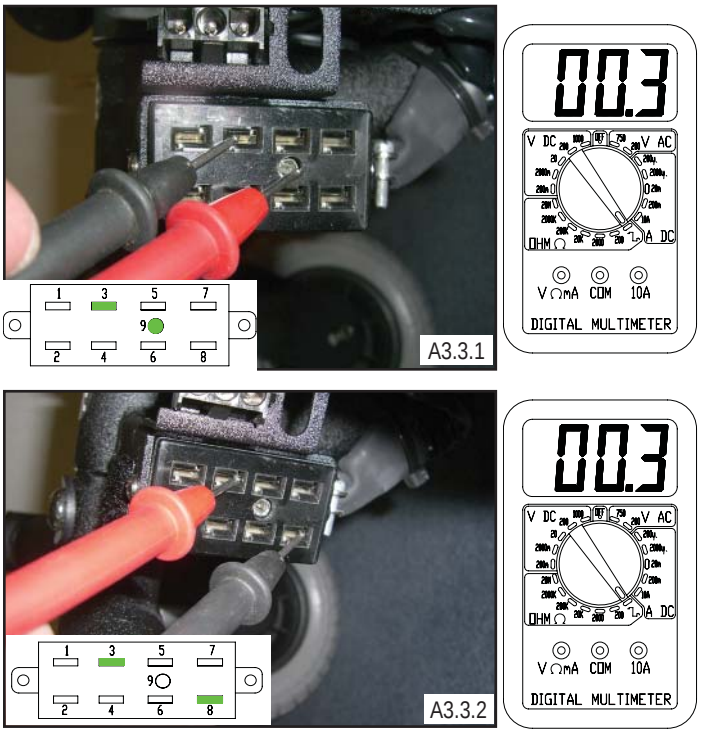
- *If the meter reads between 0 to 1.5 ohms, then replace the main harness.*
- *If none of the above corrects the problem, replace the left motor.*

3.3 Three Bars - Left Motor Wiring Trip

The left hand motor has a short circuit to a battery connection.

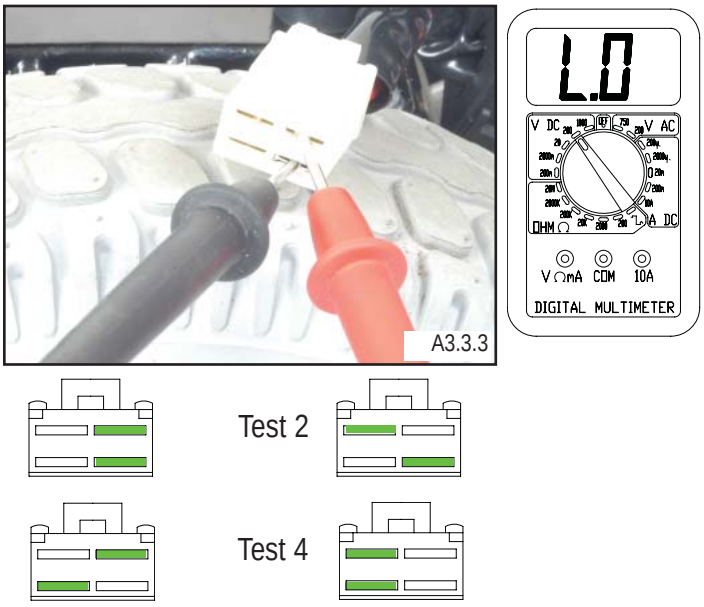
Test Left Motor Short

Check that the batteries are fully charged and in good condition; and check all cables and connections. Check the connections to the left motor, look for a loose or damaged connector. Take a resistance reading from pin 3 to pin 9 and pin 3 to pin 7 or pin 8, see (figure A3.3.1) and (A3.3.2), if the all the circuits are open (resistance is greater than 10 K ohm), then replace the controller. If the reading is short (resistance is less than 10 K ohm), proceed to check the 4-pin motor connector.



- *If the all the circuits are open (resistance is greater than 10 K ohm), then replace the controller.*

Measure the resistance from the bottom contact of the red thick wire on the 4-pin left motor connector to each of the top contacts of the connector see (figure A3.3.3). Measure the resistance from the bottom contact of the black thick wire on the 4-pin left motor connector to each of the top contacts of the connector see (below right). If all of the readings are open, then replace the main harness. If any of the readings are short, then replace the left motor.



Test 1

Test 2

Test 3

Test 4

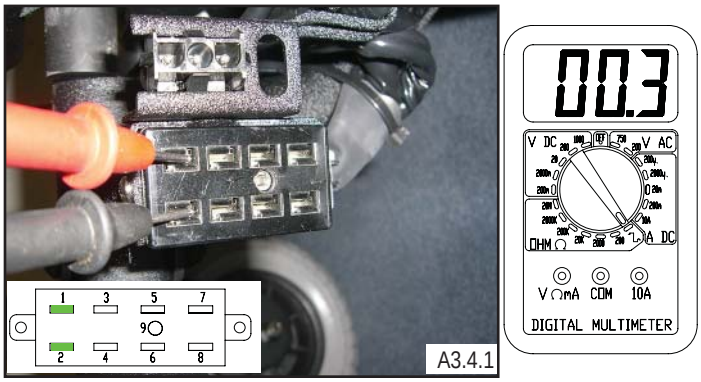
- *If all of the readings are open, then replace the main harness.*
- *If any of the readings are short, then replace the left motor.*

3.4 Four Bars- Right Motor Disconnected

The right hand motor has a bad connection. Check the connections to the right hand module.

Test Right Motor Open

Check that the batteries are fully charged and in good condition, and check all cables and connections. Check the connections to the right motor, look for a loose or damaged connector. Remove the 9-pin Beau plug and check the resistance across pin 1 and pin 2 as shown on (figure A3.4.1). If the meter reads between 0 to 1.5 ohms, then replace the controller.



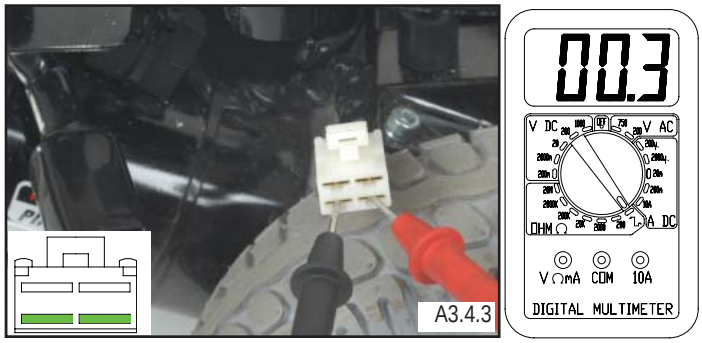
A3.4.1

- *If the meter reads between 0 and 1.5 ohms, then replace the controller.*

Otherwise, check both brushes on the right motor. (Refer to Section 4 Step 9 of this Service Manual for easiest access). Ensure that the brushes are not excessively worn, (replace as required). Top access for Motor brush shown in (figure A3.4.2) (requires shroud removal).

A3.4.2

Use the meter to check the resistance across the two bottom contacts of the thicker wires on the 4-pin motor connector as shown in (figure A3.4.3). If the meter reads between 0 to 1.5 ohms, then replace the main harness. If none of the above corrects the problem, replace the right motor.



A3.4.3

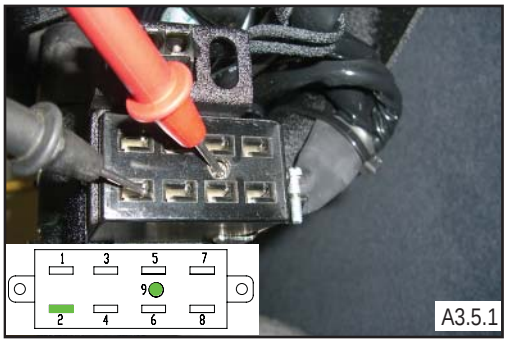
- *If the meter reads between 0 and 1.5 ohms, then replace the main harness. If this does not correct the problem, then replace the right motor.*

3.5 Five Bars - Right Motor Wiring Trip

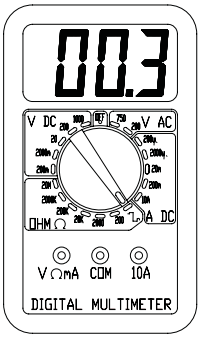
The right hand motor has a short circuit to a battery connection.

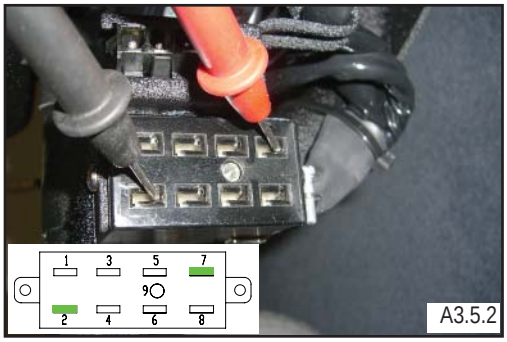
Test Right Motor Short

Check that the batteries are fully charged and in good condition, and check all cables and connections. Check the connections to the right motor, look for a loose or damaged connector. Take a resistance reading from pin 2 to pin 9 see (figure A3.5.1). Take a resistance reading from pin 2 to pin 7 or pin 8 see (figure A3.5.2), if the all the circuits are open (resistance is greater than 10K ohms), then replace the controller.

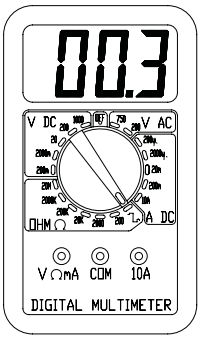


A3.5.1





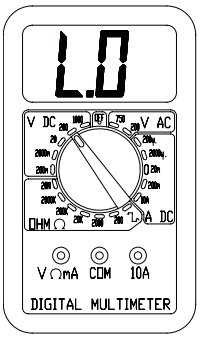
A3.5.2

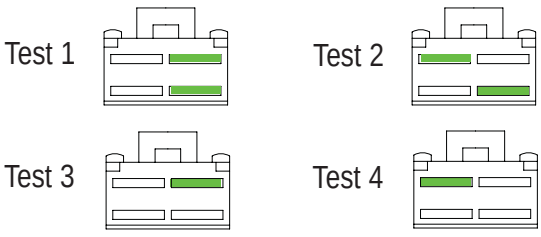


- *If the all the circuits are open (resistance is greater than 10K ohms), then replace the controller.*

If the reading is short (resistance is less than 10 K ohms) on any of the readings, proceed to check the 4-pin motor connector. Measure the resistance from the bottom contact of the red thick wire on the 4-pin right motor connector to each of the top contacts of the connectors see (figure A3.5.3). Measure the resistance from the bottom contact of the black thick wire on the 4-pin right motor connector to each the top contacts of the connector (below right). If all of the readings are open, then replace the main harness. If any of the readings are short, then replace the right motor.

A3.5.3





- *If all of the readings are open, then replace the main harness.*
- *If any of the readings are short, then replace the right motor.*

3.6 Seven Bars - Possible Joystick Trip

A joystick trip is indicated. Make sure that the joystick is in the center position before switching on the control system.

Check that the batteries are fully charged and in good condition, examine the joystick for damage. This fault can be caused by a joystick that fails to center itself due to being dirty, bent or broken. If this is the case, replace the controller.

- *If the joystick fails to center because it is bent or broken, replace the controller*

3.7 Eight Bars - Possible Control System Trip

A control system trip is indicated. Make sure that all connections are secure.

Controller Fault

Check that the batteries are fully charged and in good condition, and check all joystick connections and cables. If this does not correct the problem, then replace the controller.

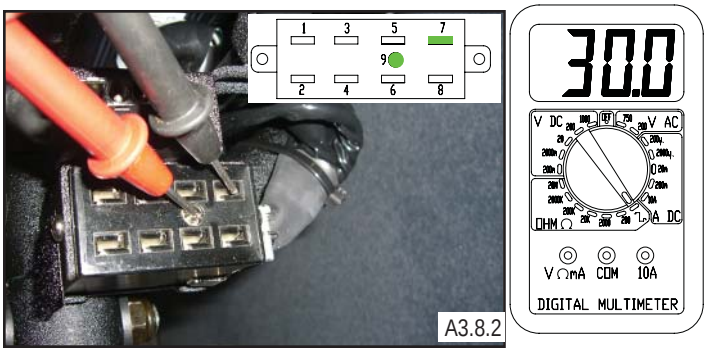
3.8 Nine Bars - Solenoid Brake Trip

Brake Fault

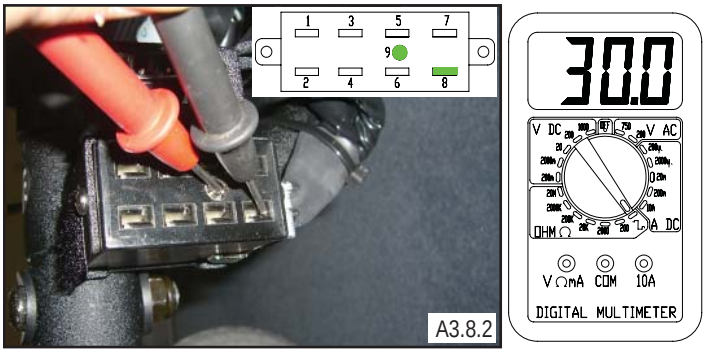
The parking brakes have a bad connection. Check the parking brake and motor connections. Make sure the control system connections are secure.

Brake Fault

Check battery connections and cables. Set the meter to ohms and measure the resistances from pin 9 to pin 7 of the 9-pin beau plug see (figure A3.8.1.) Measure the resistance from pin 9 to pin 8 of the 9 pin Beau connector see (figure A3.8.2).If both readings are approximately 30 ohms, replace the controller.



A3.8.2



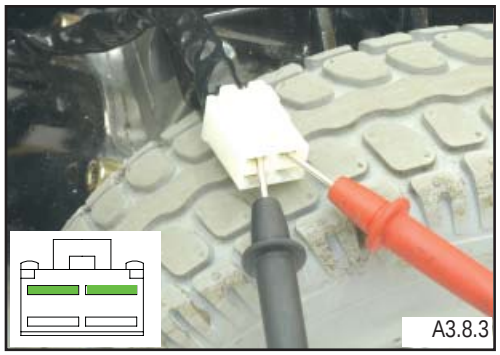
A3.8.2

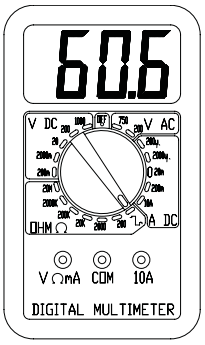
- *If both readings are approximately 30 ohms then replace the controller*

3.8 Nine Bars - Solenoid Brake Trip (cont.)

Test Motor Connections

If either or both readings are incorrect, then measure the resistance on the two small contacts on the 4-pin motor connector see (figure A3.8.3). If both motor connectors read approximately 60 ohms, then replace the main harness. Otherwise, replace the motor that does not read approximately 60 ohms.





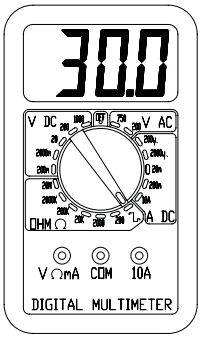
- *If both motor connectors read approximately 60 ohms, then replace the main harness. Otherwise, replace the motor that does not read approximately 60 ohms.*

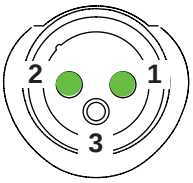
3.9 Ten Bars - High Battery Voltage

An excessive voltage has been applied to the control system. This is usually caused by a poor battery connection. Check the battery connections.

Battery Fault

Check that the batteries are fully charged, the correct voltage and in good condition. Take a voltage reading from pin 1 and pin 2 of the charger port of the VSI controller, see (figure A3.9.1) If the meter reads more than 30 volts, then check the charger. Otherwise, replace your controller.





- *If the meter reads more than 30 volts replace the charger,*

- *If the Batteries, connections, and voltage level are correct replace the controller.*

Section 4

Disassembly/Reassembly, and Adjustment

Step 1 - Controller and Seat

Note: When using the terms “Right Hand, Left Hand” this is referenced as if seated in the chair.

Disassembly

a. Squeeze down the locking legs of the 3 pin charger plug and unplug it from the rear of the chair. (figure A4.1).
b. Rock the controller plug back and forth until it is loose and then unplug it.

A4.1

Note: Remember to lay cables on the seat otherwise they may become tangled when taking off the seat.

c. Remove the Front Seat Post Knobs (figure A4.3).
d. Lift up the rear seat post latching levers and push the seat forward. (figure A4.2).
e. Remove the front seat post knobs and slide the seat backward and lift it off of the base.

A4..2

Reassembly

a. Line up the front seat frame with the front seat posts, slide the seat forward to the stops and let the seat frame rotate down in to the rear seat post latching brackets.
b. Make sure the latching levers are locked flat against the seat post brackets.
c. Plug the controller plugs into the plug receptacles at the rear of the chair.
d. Install the Front Seat Post Knobs (figure A4.3).

A4.3

Adjustment

Note: There is a setscrew in each “saddle” of the front seat post brackets that can adjust the free play of the seat frame in the bracket. Adjustment of this part is accomplished by using a 3 mm Hex wrench. After adjustment, ensure that the latching levers are fully seated and the locking pin can be installed see (figure A4.4).

A4.4

Step 2 - Seat Posts

Disassembly

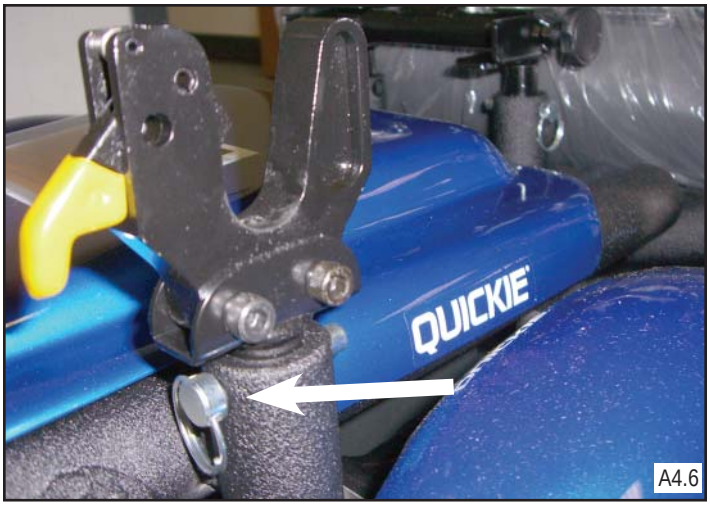
a. Pull the left spring loaded release pin to disengage post (figure A4.5). While holding the left spring loaded release pin, remove the seat post.

d. Pull out the three remaining quick release pins, remove all other seat posts (figure A4.6).

A4.5

Reassembly

a. perform the reverse of instructions above.



A4.6

Step 3 - Shroud

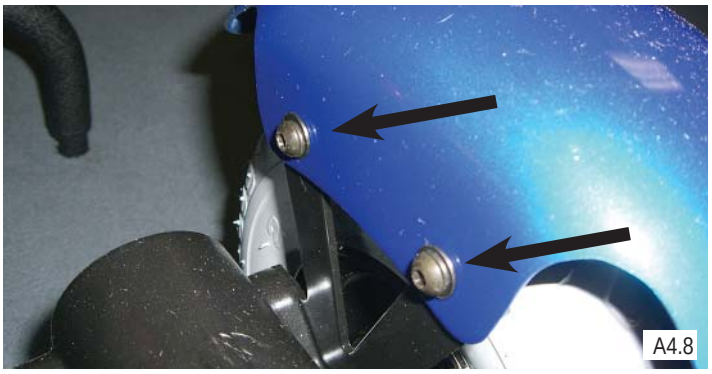
Disassembly

a. Lift the center shroud from the main frame (figure A4.7).
Note: Center shroud is attached using a hook and loop fastener system.
b. Use 4mm allen wrench to remove the fenders (figure A4.8).

Reassembly

a. perform the reverse of instructions above.

A4.7


A4.8

Step 4 - Caster Arm

Disassembly

a. Use 6mm allen wrench and 17mm deep socket wrench to remove the mounting bolt (figure A4.9).

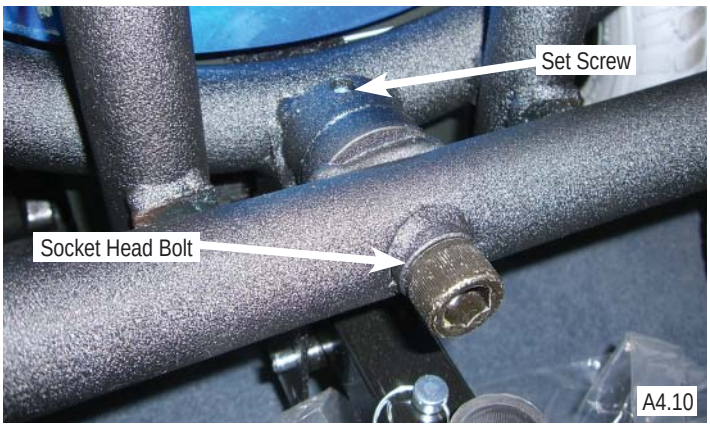
Reassembly

a. perform the reverse of instructions above.

Adjustment

Note: The front caster arm can be adjusted from pivoting slowly (figure A4.10).
a. Use a 4mm Allen wrench to back off the set screw and use a 8mm bolt head (13mm Allen wrench) to loosen or tighten the socket head bolt and make the proper adjustment (operator preference).

A4.9



A4.10

Step 5 - Charger

Disassembly

a. Peel the velcro strip apart, and remove the on-board charger (figure A4.11).

b. Slide the female charger plug out of the beau plug bracket (figure A4.12)

c. Depress the locking tabs and unplug the A/C plug and charger light indicator plug.

Reassembly

a. Perform the reverse of instructions above.

A4.11

A4.12

Step 6 - Battery

Disassembly

a. There are two ways to access the batteries. One is fold the back and flip the seat forward by release the rear seat post latches (figure A4.13).

A4.13

b. The other is to remove the quick release pins on the bottom frame (figure A4.14) and removes the top main frame and seat (figure A4.15).

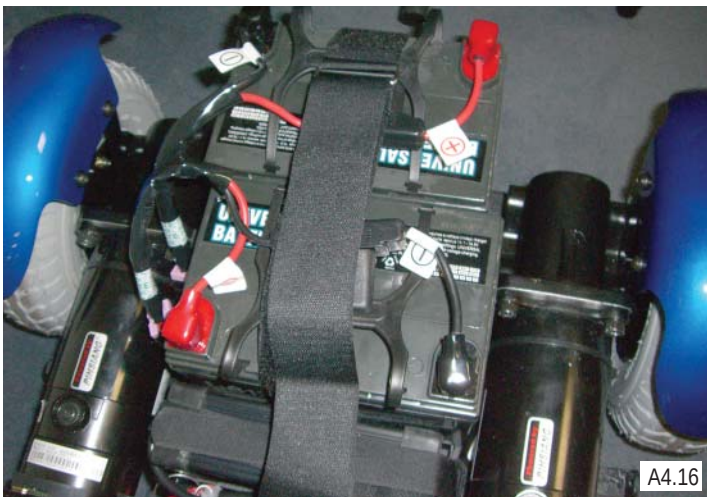
A4.14

A4.15

c. Remove the Velcro strap (figure A4.16).
d. Depress the locking tabs and unplug the battery connectors.
e. Grip the battery handle and pull the battery out base.

Reassembly

a. Perform the reverse of instructions above.


A4.16

Step 7 - Motor/Wheel

Disassembly

Note: For ease of disassembly, set the base frame on a block where all four wheels are at least 1 inch above the ground.

a. Unwrap the wire looms from the motor and pull the motor connector out (figure A4.17).

b. Depress the motor connector locking tab and unplug it.

c. Straighten the lock washer tab of the drive wheel.

d. Use a 13mm socket wrench to remove the drive wheel retention bolt, then pull the drive wheel out from the motor shaft (figure A4.18).

e. Use a 5mm Allen wrench to remove the 4 mounting screws
(figure A4.19).

f. Pull the motor-wheel assembly out .

Note: If the drive wheel is difficult to remove, then remove the wheel plate screws (5mm Allen head)

A4.17

A4.18

A4.19

Reassembly

a. Perform the reverse of instructions above.

Note: Torque specifications

* Motor mounting screws 15-20 ft-lbs
* Wheel retention bolt 15-20 ft-lbs
* Wheel plate screw 15-20 ft-lbs

Adjustment

Note: There is a suspension bumper on the frame that limits
the top frame's movement (figure A4.20).

a. Use a 13mm open wrench to loosen or tighten the jam nut and make the proper adjustment (operator preference).

A4.20

Step 8 - Check / Replace Motor Brushes

A4.21

Disassembly

Access to Motor Brushes

a. For quick access to Motor Brushes, perform steps 6b of this section.

b. Use a flat blade screwdriver to remove the motor brush cap and then remove the brushes for inspection.
(figure A4.21).

c. Inspect Motor brushes for excessive wear, uneven wear, and/or severe discoloration.

d. If any of these conditions exist, replace/install both brushes for the motor in question.

Hint: Make sure that the brushes are seated properly before re-installing the brush caps.

Reassembly

a. Reassemble your S11, by performing the Reverse of steps 6b.

Step 9 - Wire Harness

Disassembly

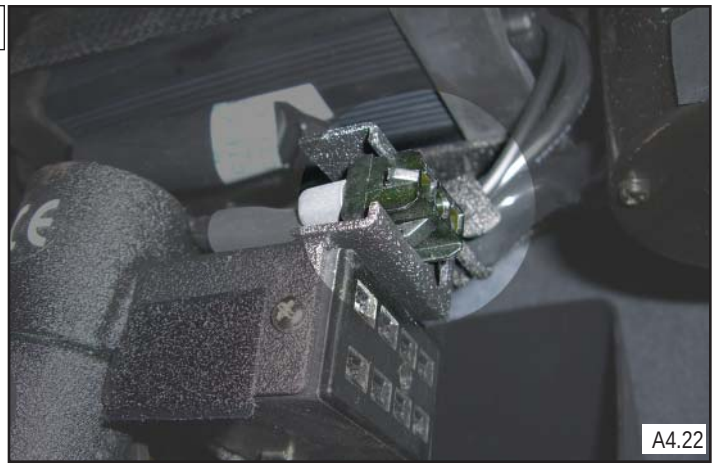
a. Remove all the zip ties on the base frame.
b. Unwrap all the wire loom ties securing the harness to the frame.
c. For the main harness, remove the two screws that holding
the female beau plug (figure A4.22).
d. Remove the circuit breaker locking nut and push it through the bracket (figure A4.23), then remove the main wire harness.
e. For the light and A/C harness, remove the rear shroud (figure A4.24)
and then remove the mounting screws on the A/C plug bracket.(figure A4.23).
f. Push the light harness through the bracket.
g. Pull the A/C harness through the bracket.

Reassembly

a. Reverse above instructions.

Adjustment

Note: The circuit breaker can be removed without removing the main harness.
a. Pull the quick disconnect terminal out from the bottom of the circuit breaker, then remove the circuit breaker locking nut.


A4.22

A4.23

A4.24